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ABSTRACT

Following an abstract and introduction, this document reviews five research projects on the learning experiences of workers. The first two concern the environment required for successful learning in the workplace, and the last three address implementation of e-learning programs. (The findings from the first two studies revealed 24 conditions that must be met for successful learning in the workplace, including linking learning to improved performance, valuing collaborations in learning, and management awareness of the need for learning. Conditions for successful e-learning revealed by the last three studies included the relevance of training to the current job, user ownership and control of the process, a culture of support by the training provider and employer, and personal recognition for learning achieved.) A wider context is next provided through reference to another literature review and other writings. Characteristics of successful approaches to online work-based learning are presented, as well as four features required to produce those characteristics (intelligent and intuitive tools, and extensive database of materials, imaginative design, and a shared commitment). Three successful programs are described. A conclusion states that online work-based learning will succeed where it is personalized, managed by the user, relevant to the user's work, supported by the employer, linked to just-in-time material, and fully supported within a healthy learning environment. There are 55 references and two appendixes. (SLR)

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A REVIEW OF RESEARCH AND PRACTICE IN E-LEARNING IN THE WORK-PLACE AND PROPOSALS FOR ITS EFFECTIVE USE

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ABSTRACT

The need for workplace learning to expand in response to changing demands of the workforce and a growing interest in lifelong learning are increasingly acknowledged in the literature and through various government initiatives within the European Union. However, providing work-place learners with appropriate learning materials, personal advice and access to academic credit have always been major stumbling blocks to sustainable growth in this area. E-learning, with its superficial promise of easy scalability and ease of distribution, has been hailed as a potential major contributor to the finding of solutions to these problems. This Paper presents five small-scale research projects led by the author focused on the learning experiences of people at work, three of them in the context of online learning and training. A synthesis of the findings leads to the formulation of a set of conditions that need to be met if online learning in the work-place is to be successful. These conditions relate to relevance to the job at hand, ownership and control of the process by the user, a culture of support from both the provider and the work environment, and personal recognition for the learning achieved. A review of recent literature on e-learning suggests that practice in online pedagogy is lagging behind the distinctive needs of work-place learners, though the technical potential to meet those needs is readily available. Other surveys of current practice give support to the presence of a pedagogical gap between provision and need. Three contrasting examples of possible ways forward are presented, each of which exploits the distinctive features of new technology to provide a constructivist approach explicitly managed by the learners themselves. The first enables people, online, to formulate and manage their own programme of learning arising from their normal work activity leading to full university qualifications. The second shows how companies are making use of the Internet to enable employees to contribute to and tap into e-resources and experience directly relevant to their learning needs. The third is a model of how an online support system can be built around the personal initiatives and needs of individual employees within a culture of support and reward. The Paper concludes that designers and providers of work-based online learning need to bring together the principles of constructivist pedagogy, an understanding of the dynamics of learning at work, sensitivity to user motivation and need for recognition and an awareness of what is technically possible.

INTRODUCTION

This paper is about the potential use of new technology in support of learning in the work-place[1]. A model for online personalised learner-managed learning through work is presented, based on a synthesis of literature reviews[2], small-scale research projects and conceptual modelling conducted by the author and colleagues in the International Centre for Learner

[1] For the purposes of this paper, work-based learning is taken to refer to learning through work itself, either through informal processes or conscious and structured support for authentic learning activities. Off-site training or unrelated classes for lifestyle improvement are excluded. The concept of informal learning through work, with its focus on tacit knowledge, experiential learning and communities of practice, is well argued elsewhere, typically in Boud and Solomons (2001), Cairns and Stephenson (2002) and Cunningham et al (2000) and is not reprised here.

[2] The full lists of items reviewed by the author can be seen at the appropriate URLs cited in the .

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Managed Learning (ICLML[3]) from 1998 to the present day, discussed in the context of current debates on online pedagogies relevant to the work-place.

Interest in online work-based learning is high. Across Europe, national governments have led the way by investing heavily in infrastructure and development projects. The EU, for instance, announced at the Lisbon Summit in March 2000 its intention to make the EU 'the most competitive and dynamic knowledge-driven economy in the world' through 'developing e-learning for all citizens'. (Cedefop, *2001)*. The UK Government set up the highly innovative University for Industry in 1998 to raise individual employability and corporate effectiveness through a national network of e-learning services, arguing that such learning would increase the skills base of the nation, facilitate the management of change and increase the knowledge base of companies (DfEE 1998).

Much of the hype about the efficacy of e-learning in the work-place focuses on claims of cost efficiency. Moses (2001) typically argues as long as e-learning can provide equivalent or better outcomes *'at the same or lower cost than traditional training,'* then it will flourish. Brandon Hall's study of e-learning benchmarks in 10 major companies reveals *'massive results'* (IBM saving $200m in one year) by reducing time spent in formal training and increased scale, though he does concede the emphasis is beginning to switch from cost reduction to increased value. Claimed cost benefits were prominent at the 2002 e-learning conference of the Ontario Society for Training and Development e.g.: *'reduces training time, travel and accommodation costs'* (Leck and Gram, 2002), gives you *'more for your money'* (Murray, J, Carson, T and Henderson G, 2002) and *'e-learning plans are driven by financial, customer and internal metrics'* (Grant, 2002).

Whilst acknowledging the importance of corporate costs and impact on national economies, this paper focuses on pedagogical aspects of online learning and learning in the work-place and explores how best to maximize the educational benefit of the latter through the former.

ICLML RESEARCH REPORTS

The International Centre for Learner Managed Learning at Middlesex University, London, UK has completed four relatively small-scale research projects and is completing a fifth, all of them relevant in some way to this issue.

ICLML research projects one and two: RSA/OCR (1997 – 1999)
The first of these research studies, funded in two parts by the Royal Society of Arts Examinations Board (the RSA, later part of OCR, the Oxford and Cambridge RSA Examinations Board), were not in themselves about e-learning, but about the circumstances that best sustain what the studies called 'a *healthy learning milieu'* in the work-place. The studies are included in this paper because they outline some of the conditions within which successful e-learning initiatives might be successfully set.

[3] ICLML was established in 1997 at Middlesex University, London England and comprises netw researchers drawn from across Middlesex University and elsewhere in the UK and Australia.

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The first of these two reports (Williams et al, 1998) consisted of case studies of how three different organisations were making use of externally validated national vocational qualifications (NVQs). The three case studies drew on intensive face to face interviews with key players in each organisation. The data were explored within the context of an extensive literature review (see full report on www.iclml.com) on 'the capable organisation' leading to a set of propositions about the kinds of conditions that needed to prevail for effective work-related learning to take place in the work-place itself. A follow-up study (Stephenson et al, 1999 and available at www.iclml.com) explored these propositions across a total of 10 cases that involved qualitative analyses of the experiences of over 400 employees engaged in on-the-job learning and assessment within a further review of literature[4] on healthy work-place learning milieu. A total of twenty-five indicators of a healthy learning milieu were identified. These indicators are shown in Table 1.

Table 1. A Healthy Learning Milieu in the Work-place (Stephenson et al 1999)

A healthy learning milieu, in the context of organisational capability, would exist when:		
all members (including the most senior)... • see their learning linked to improved performance for the organisation • perceive they have a role in their own learning • identify with the organisation's vision and work • perceive that the organisation has a role as a learning driven organisation • have a conscious awareness (mindfulness) of learning and thinking to solve problems • value learning as knowledge development • have a perception of being empowered • seek out learning and qualifications	**2. the culture shows...** • work-talk centred on solving problems and the role members have in that process • relevant models as keys to further employee development and learning • self-efficacy and corporate self-efficacy are valued, seen, developed and discussed • a palpable focus on innovation, creativity, and adaptability is fostered, encouraged and valued by the organisation • collaboration in learning is valued	**3. the organisation ensures...** • training is seen as more than short term skill development • management of the organisation is aware of the need for learning at all levels • supervisors and managers are involved in the training and learning processes • self-managing teams exist in the organisations • self-management of individual development and in teams is supported • competency-based approaches extend to management • the organisation openly professes to be either a Learning Organisation or a Capable Organisation (or some other term) • formal procedures (wage and salary conditions and contracts) assist the learning process • feedback processes are in place to ensure that employees know their value and appreciation by the organisation • middle managers are trained in roles to foster and develop learning • assessors or "partners-in-learning" play a role in training/learning

The indicators of a healthy learning milieu set out in Table One relate to the organisational culture as a whole. In short, the indicators clearly suggest that employees learn best at work when they receive **active support** and **reward** for taking **ownership** of their learning whilst engaged in the normal business of the organisation. Any approach to work-based learning,

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the authors of this report argued, needs to recognise that personal ownership of and official recognition for that learning are seen as crucial to sustaining motivation for continuous development through work.

ICLML research project three: SUPERSTELLA (1999 - 2001)

The third study, the SuperStella project (Stephenson and Basiel, 2001), was funded by the European Union through its ADAPT programme to stimulate and evaluate the use of e-learning in small and medium sized organisations (SMEs, defined as fewer than 250 employees) where learning tends to be unplanned, informal and tied to specific work activities (Gibb, 1999; Gray, 1999; Westhead & Storey, 1999). The project targeted front-line work-place supervisors as key figures in the introduction of new approaches to learning for shop floor or office workers, many of whom lacked formal education or training since leaving school. Supervisors were enrolled onto mentoring courses to acquire new supervisory skills delivered in mentoring mode from a distance via the Internet. Before these trainee mentors could secure their nationally recognised certification as mentors, they in turn had to mentor a group of their supervisees in the learning of IT skills at work, potentially creating highly localised micro learning cultures.

Regional clusters of SMEs were established in London, Staffordshire, Wales and Yorkshire. Overall, 262 people registered on the programme, 24% as supervisors and 76% as supervisees. Drop out levels averaged 20% but there was wide regional variation (regions with many 'micro' companies lost most, those with larger companies lost least.) The evaluation used a pre-project survey and a post-project survey completed by 57% of the total. Personal experiences of 32 participants drawn from all regions were explored through in-depth face-to-face interviews conducted in the work-place. An action research model was used, developing propositions grounded in the experience of the participants observed at each stage of the project, leading to the development of 'emerging propositions' which were subsequently tested with other groups. At each stage, open discussions were used to identify new trends. Analyses of data from the in-depth interviews were fed back to the project and cluster managers for verification that they 'rang true' for them.

Unsurprisingly, much of the evidence collected in the study confirmed the many obstacles that have to be overcome before *any* form of work-based learning can be successfully developed in small companies: - work deadlines always take precedence, lack of time and space for in-house training, too few employees to cover for off-the-job learning and low levels of management input into the development of a learning culture. When it comes to the use of new technology, the initial cost of networks and terminals can be added to that list.

However, the study also revealed that new technology can have an impact when these essentially housekeeping obstacles are removed. Any initial dissonance between expectations of being formally trained and the participatory nature of online learning (Coomey

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and Stephenson, 2001) can be overcome by careful induction. Analyses of the learning experiences suggests that online programmes in the work-place are likely to be successful when they are

- flexible in pace and duration;
- sensitive to participants' unexpected pressures on time and resources;
- fully explained in advance in terms of practical requirements, mode of study and expected outcomes;
- supported by proactive, attentive and sensitive online supervisors;
- open to 'successful withdrawal' when judged appropriate by the participant;
- negotiated between the supplier and the client - personalised to customer circumstances;
- supported in-house, through normal working relationships.

Collateral benefits included the moderation of supervisor behaviour towards supervisees, and the transfer of newly acquired skills to other company activities. Finally, SuperStella confirmed the importance of a) participants taking possession of the activity based on their own personal interest and work aspirations, b) support within the organisation, and c) encouragement to take their learning further.

ICLML research project four: L-CHANGE (Jan 2001 - Jan 2003)

The third study, L-Change, due to be published in May 2003, has a different focus. L-Change, also funded by the European Union, reviewed the perceptions of key providers of e-learning on current and future market trends, giving insight into the expected pattern of usage as anticipated by those investing in future supply. Sixty-three 'principal representatives of supply' (PRS) were drawn from Denmark, France, Germany, Greece, Hungary, Italy, Romania, Spain and UK. Twelve were from the private sector ICT industry (telecoms, computers, internet), seven were broadcasting corporations (public and private), 19 were educational publishers and equipment suppliers, 11 were other industrial or commercial organisations, 14 were education and training providers (public or quasi-public, non-profit sector), and 14 were partnership brokers, major consultants and policy makers. Some PRS occupied more than one sector. Informants represented organisations that varied from well-established major international companies employing in excess of 100,000 to small niche suppliers of between 10 and 50 employees. Their products and services cover academic and vocational learning for qualifications, in-company training, leisure and learning support services and systems. The research was based on lengthy semi-structured interviews and the resultant data were analysed on a cross-European cross-sector basis, enabling common themes and differences to emerge.

Many of the outcomes of the L-Change strategic review of the e-learning market relate to other matters, such as trends in infrastructure development, pricing policies and market consolidation. However, many outcomes are of significance to the theme of this paper. In summary, suppliers of e-learning services and materials are predicting:

- more focus on the pedagogical design of e-learning products and services, in both educational and corporate markets;

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- more 'blended' or integrated learning and training packages that combine a variety of media with online and face-to-face support;
- 'mass customisation' in which common systems, platforms and environments support the delivery of personalised services and content in response to individual user need;
- learner support services will change from technical help to mentoring, coaching and other forms of advice as services become more personalised and users become more independent;
- significant opportunities for organisations and individuals who can broker effective collaboration between disparate providers in response to an understanding of individual client needs.

The above prediction of a clear trend towards greater personalisation of e-learning services for both the corporate and educational markets in Europe are based on suppliers' commercial judgements about current investment priorities.

The L-Change research programme also embraced a review of public investment in the development of cutting edge technology-enhanced solutions for supporting learning in the workplace. A number of major EU funded projects are bringing together the latest thinking in pedagogy and technology to help support greater personalised e-learning in the work-place. In particular, these projects aim to provide

- collaborative and networked learning systems
- flexibility based on on-demand and just-in-time principles
- skills learning environments tolerant of mistakes
- direct learner involvement through experiential learning processes
- the development of common standards to enable users to draw materials from a variety of sources
- the management of access to re-usable meta-tagged content ('learning objects') according to individual need.

The above technical innovations directly relate to the features of the healthy learning milieu identified in the RSA/OCR studies described earlier. As another reviewer of EU research and development initiatives remarks, this research *'centres the learner at the heart of a web of innovative learning processes and leading edge technologies'. (Ecotec review of training, p5)*

ICLML research project five: BLATE - Blended Learning And Training Evaluation (2002 - 2003)

The final ICLML research project included in this paper is an evaluation of the introduction of a blended learning package of IT training developed by one of the UK's largest commercial providers of IT training for groups. The company and its clients are more familiar with conventional off-site face-to-face sessions in the training room. The package includes a number of e-learning features such as networks, online specialist support and just-in-time access to personalised specialist materials. The research is using focus groups, online pre and post surveys, interviews with participants and their employers to elicit the value or otherwise of the online experience, the critical factors in its design and delivery and its impact,

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if any, on the effectiveness of the training for the client. There are 6 major client customers for the blended training programme and 80 participants.

The ongoing BLATE evaluation is concentrating on the overall experience of learners and employers and, when the six month training programme is over, the perceived benefits. At the time of writing this paper, (March 2003) only interim results are available. Early indications are that the key attraction for employers is the opportunity for companies to manage the balance between work imperatives and training schedules more effectively. The loss of working time and expertise from off-site face - to -face training sessions is much reduced thereby enabling companies to support the training of more people. Individual learners within the same company can manage different schedules according to their personal working patterns. Employers are also attracted by the prospect of greater impact on the work itself, because much of the training can take place directly within the working context. Preliminary responses to questions about their overall preferences for learning at work suggest that employees particularly like to learn from work-place supervisors, managers and mentors (80%), through experience (60%) and working on problems or hands-on projects (73%). Key motivators are gaining new skills and knowledge relevant to their work (93%), personal development (86%) and future careers (80%)

Convergence

Each of the above ICLML research projects was separately commissioned. Only when looked at collectively is it possible to put together an overall view of the bigger picture of online learning in the work-place. There is a remarkable convergence of their findings as shown by the following:

- employees learn best when they receive active support and reward for taking ownership of their learning whilst engaged in their normal business (RSA/OCR);
- provision should be flexible, supported by personal supervision and negotiated with the supplier (SuperStella);
- providers are focusing on personalised services and content in response to individual user need (L-Change);
- support is moving from instruction to mentoring, coaching and other forms of personal advice (L-Change);
- major R & D investment is focused on personalisation tools and systems (L-Change);
- employers want individual employees to manage their own work and learning priorities and for their learning to impact on their work (BLATE);
- employees learn best through the process of work itself, with local help;
- employees seek improvements in their skills and personal development.

THE WIDER CONTEXT

The above focus on support, personalisation and relevance to work as a basis for successful online work-based learning is derived from a very limited number of small-scale research projects completed by the author and others. These features are explored in the wider context of e-learning pedagogy in general and e-learning in the work-place in particular.

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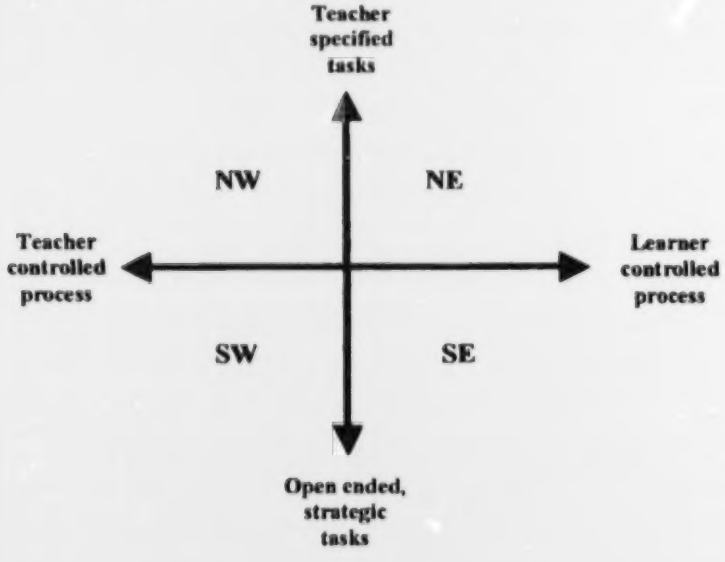
E-learning pedagogy

As part of ICLML's literature review of current experience of e-learning worldwide, Coomey and Stephenson (Coomey & Stephenson, 2001) reviewed one hundred research reports published mostly in the period 1998 - 2000 (see Appendix A for an indicative list). Differences in conclusions and lessons learned reflected considerable variations in the prevailing pedagogical paradigms of case examples. In order to clarify these research results, the authors devised a comparative framework - the Online Paradigm Grid (Figure One) based on the extent to which the tasks and learning processes were controlled by the teacher or the learner. Very few of the examples were in the learner managed quadrant (the SE). The vast majority were firmly located at the opposite end, in the teacher and trainer controlled quadrant. Several of the examples were scattered across the intermediate paradigms where the learner controlled either the process or the task but not both.

Figure 1. Online Paradigm Grid



The review of ICLML research projects already described concluded that the most appropriate pedagogical model for online work-based learning is to be found in the SE quadrant of the grid (learner-managed tasks/learner-managed processes). Nevertheless, few examples revealed in the literature occupied that quadrant, despite the many technical opportunities for learner management that existed at the time (Coomey & Stephenson 2001) or were being developed (Aroyo and Kommer, 1999).

This mismatch between actual provision and what is technically possible and pedagogically desirable is partly explained by a lack of awareness amongst teachers and trainers of what is available and how it might best be exploited. A further dimension is the corresponding lack of

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awareness amongst designers of pedagogical materials for learning in the workplace. (Good, 2001; Shaw, 2001). There is also a tendency for trainers and teachers to continue with their traditional paradigms despite the wider opportunities that new technology opens up (Alexander and Boud, 2001).

E-learning at work

Other commentators (Leathwood, 1999; Palloff and Pratt, 2001) have expressed serious doubts about the nature of the assumed pedagogy that underpins many online learning programmes and their execution, as exposed by Cairns and Stephenson at AERA 2002. These doubts are explored further in the context of other reviews of current practice.

Blended or Integrated Learning in the form of e-mail, word-processing, PowerPoint, and the Web, in support of lectures and tutorials has become '*standard as part of the teaching and learning process*' (Collis, B., & Moonen, J. (2001). Such limited use of technological innovations is still essentially traditional in its pedagogy, occupying the NW quadrant of Figure One. The blended approach used by BLATE and other corporate entities, despite the use of innovative tools, delivers a tightly defined externally determined set of outcomes leading to external assessment. One commentator on blended learning (Kerry Elfstom 2002), whilst acknowledging there is '*no replacement for practical on the job experience*', describes three styles of blended work-based learning currently in use none of which sits comfortably in the SE quadrant:

- e-Learning within the context of a traditional instructor led course
- on-line knowledge based learning modules followed by a face-to-face coaching/mentoring session.
- self directed learning materials delivered on-line or in book plus audiovisual form interspersed with strategic face-to-face practical experience sessions.

A recent review of current practice in e-teaching (Bonk et al, 2001) also revealed deficiencies in the pedagogical underpinning for much of what is provided. The review concluded that many online instructors needed help in familiarising themselves with the research on effective use of the medium. The review also recommended that institutions should help develop and research different types of pedagogical tools for e-learning that foster student higher-order thinking and collaboration. In a parallel review of current practice amongst 201 online trainers, Bonk et al (2001) complain of a *'dearth of pedagogically interactive and motivating activities within Web-based learning environments'*. Bonk also acknowledges the need for greater attention to pedagogical aspects such as learner support, assessment and evaluation. Echoing our concern for an effective service for learning through work, the Bonk review argued for more pedagogical tools and mechanisms that promoted *'relevance, feedback, goals, interactivity, and choice,'* items considered vital to increasing engagement whilst reducing the current high rates of online attrition currently experienced by many organizations.

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Murray, D (2000) discovered that 96 per cent of Canadian employers believe that ICT will be effective in dealing with employee skill gaps. Support for specific aspects of e-learning for learning through work was much less dominant. 25 per cent of employers, for instance, believe that "*improved just-in-time learning*" is the most important reason to use e-learning technologies and thirteen per cent of employers said the top reason for using learning technologies was "*improved employee control over learning.*' Murray goes on to assert (August 2001)

- *E-learning has the potential to transform how and when employees learn.*
- *Learning will become more integrated with work and will use shorter, more modular, just-in-time delivery systems.*

Murray's advice on how to proceed chimes with some of the findings from the ICLML research cited earlier, particularly the need to develop an organizational learning culture that promotes and values e-learning, aligns e-learning with core business needs, involves employees in content development and integrates e-learning with knowledge management. The aim, Murray argues, is to parallel *'the trend away from training to lifelong learning'*. However, unlike the ICLML studies and despite the 13% of employers talking about *'improved employee control over learning'*, Murray does not argue for the *centrality* of ownership of the process by the learners themselves.

In a survey of universities, Collis and van der Wende (2002) found the pedagogical response to the needs of people learning in the work-place *'is not well developed'*. *'Progress'*, they report, is *'slow and not radical'* and confined in the main to blended mixes of face-to-face instruction and online support. Having passed through the stage of infrastructure development, Collis and van der Wende observe, *'the second stage, i.e. rich pedagogical use of this infrastructure, is in many cases still in development'* and conclude that *'new pedagogical strategies and visions are not evolving at a similar pace.'*

The gap between pedagogical need and actual provision is illuminated by yet another Bonk survey, this time of 230 research reports conducted with R. A. Wisher for the US Army. The Bonk and Wisher report (2000) does address the issue of learner ownership. *'Training'*, they report, *'will become more learner-centric with soldiers assuming increased responsibility for the acquisition of knowledge and the development of skills.'* They cite Bracewell, Breuleux, Laferriere, Benoit, & Abdous, (1998), Hannafin & Land, (1997) and Harasim, (1990) as advocating *'the need to shift from instructor-centered to student-centered'* pedagogical approaches. The challenge is technical - providing the right tools and systems - not pedagogical. Bonk and Wisher (2000) prescribe a revisit to the principles of learner centred learning articulated by the American Psychology Association in 1995 which set out 14 principles grouped around Cognitive and Metacognitive Factors, Motivational and Affective Factors, Developmental and Social Factors and Individual Differences.

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Woodall (2003) advocates increased personalized services and an individualized approach to the learner sustained by a menu of

- on-line experts,
- fast solutions in skills emergencies in real time;
- collaboration as leverage for tacit knowledge of colleagues,

These services and resources, Woodall argues, should '*pertain to his or her background, job and career at that very moment.*'

A number of commentators ((Race, 1994; Smith and Pourchot, 1998, Driscoll, Foster & Stephenson 1998, Boud and Solomon 2001) stress the relevance of constructivist, lifelong learning, adult and experiential educational pedagogies for the design and delivery of work-based e-learning. Authentic learning takes place when meaning is created from experience (Bruner 1977, 1981, Vygotsky, 1978). In the case of learning through work, authenticity does not need to be contrived since the learning experiences are inseparable from the worker's own reality. The role of the technology in support of authentic learning through work is to marshal highly personalised material and services to encourage and reward those specific needs. Woodall (2003) talks about '*active participation in problem solving*', '*relevance to the learner*', tracking learner progress and personalised content delivery in order to allow '*the individual to expand their responsibility for their own learning and thereby increase their motivation*' leaving them free to access as wide a range of resources as they wish.

Sawchuck (2001), looking at the labour movement's engagement with e-learning, concluded that the effectiveness of work-place online learning revolved around recognition of informal learning, tacit dimensions of participation, broader context of participants' lives, and linkages between the online and offline worlds. Gilroy (2001) claims that '*the elements that comprise the experience around the content*' are important and advocates '*an open source technology strategy as the best approach to the development of shared knowledge and learning*', one that lends itself to learners taking '*total control over their learning environments*'. Such environments (according to McAndrew et al 2002) should support dialogue in the building of knowledge for an individual and for a group, following the ideas of the conversational framework reflecting the social process of learning as considered by Vygotsky (1978)

In one of the rare studies of SMEs, Brink et al (2002) discovered that e-learning helped workers to balance the conflicting demands of work and learning and confirmed the importance of learning methodologies that help people do their jobs more effectively.

SOME WAYS AHEAD

A synthesis of the outcomes of ICLML research, the surveys of current practice and debates on online learning, suggests that successful approaches to online work-based learning would have the following characteristics:

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- recognises the centrality of the learner as the initiator, controller and beneficiary of the learning that takes place;
- is consistent with informal patterns of learning through work;
- helps the learner to clarify learning needs;
- helps the learner to formulate plans and learning goals relevant to greater effectiveness at work;
- is relevant to longer term personal development, with scope for strategic aims, and development of personal portfolios;
- engages with company / employer needs;
- links to internal and external networks of peers, fellow specialists and expertise relevant to goals;
- facilitates sharing, recording and accessing experience for future benefit;
- gives easy and just-in-time access to personalised specialist material in response to need;
- is available when and where the learner needs it;
- has built-in opportunities for recognition of achievement, including enhanced qualifications or credit for new learning;
- is integrated within a comprehensive management culture of learning and support throughout the organisation.

Four features are required to make the above a reality:

- the use of ***intelligent and intuitive tools*** that can interpret and anticipate users' needs and requirements and organise appropriate responses when and how required;
- ***an extensive database*** of specialist materials electronically tagged to facilitate ease of retrieval according to personal need;
- ***imaginative design***, built around a personalised portal that puts the user in control of a range of resources, services, networks and expertise;
- ***a shared commitment***, amongst specialist helpers, instructors and coaches, to learner centred ad learner managed development.

Three examples are presented.

Unipart Group of Companies (UGC). One example of how e-learning can support a healthy learning milieu is Unipart (**http://www.ugc.co.uk/**), a leading UK storage and distribution company servicing the motor trade. Unipart see e-leaning as a way of building learning into the fabric of the organisation by making it highly visible and available in all areas including shop floor, board-room and public spaces e.g. reception areas. The aim is to give all people the will and opportunity to engage in learning from and for their work. The focus is on the sustainability of corporate and personal improvement by capturing the learning that occurs from any intervention anywhere within the company and making that information available to anyone who might face similar situations. Individuals have instant access to specialist expertise to deal with problems where and when they need it, and are encouraged to log progress and learning from mistakes into a general resource. Participation in the service is facilitated by quality circles, 'faculty on the floor' and the 'leading edge U' (university). The company claims to save £2 to £3 million per annum and is selling its online expertise to others.

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UK's University for Industry (UfI) Learning Through Work programme. Much of the online material produced by UfI under its brand name 'learndirect' consists of conventional 'bite-sized' units of interactive and supported instruction in a wide range of skills relevant to key industries. Over two million people are currently registered as learners. However, one of its products, Learning Through Work (LTW), has most of the features identified at the beginning of this section. Currently, almost 3000 people are using the online LTW programme (the first part of which is available free on http://www.learndirect-ltw.co.uk/). LTW enables people at work, in consultation with their employer and external experts, a put together a distinctive programme of study arising from their work leading to a unique qualification at any level up to doctorate in any one of ten participating UK universities. The starting point is the individual learner and their work. Participants in the scheme have online access to a range of expertise, networks of other learners, and specialist university support. Participants are helped, online, to construct a work-based learning programme that is some or all of the following:

- *problem-based or issue-led;*
- *Task related*
- *innovative;*
- *both strategic and just-in-time;*
- *autonomously managed and self-regulated;*
- *self-motivated;*
- *team-based;*
- *concerned with enhancing personal performance*, or;
- *concerned with improving the performance of a business, enterprise or organisation.*

Participants are able to devise and negotiate their own learning contract leading to their intended award, submit that contract to a university for formal registration, pursue their work-based programme with support from the university and submit their final work online for formal assessment. The first person to graduate received a first class honours degree from the University of Derby in 2002.

Do It Even Better© Do it Even Better is a copyrighted model[5] currently under development in the UK public education sector. Its aim is to help people engage in improving their own practice. Do It Even Better was featured in an invited lecture to the Royal Society of Arts (RSA) in 2001 (Stephenson, 2002). The methodology is being developed by a group of schools to help their managers and teachers to improve their performance via a purpose-built online portal based on the key features of self-managed online work-based learning. It is difficult to present a live interactive Internet exchange in an academic paper but the transcript of the presentation to the RSA gives a flavour of how it works (see Box 1). Do It Even Better uses state of the

[5] Contact the author at J.Stephenson@mdx.ac.uk for details

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art natural language conversion software. It allows the user to decide the terms of the exchange. It all starts from the user's perception of their learning need in the context of their work.

Box 1: Transcript of description of 'Do It Even Better'

Dialogue box says 'Tell us what you want to do even better…'

I reply that I want to be better at….

> *…getting more out of my team. We are all under a lot of pressure to meet targets. I am very busy doing other things so I want my team to be able to take more responsibility for their own work. I have my own appraisal coming up soon and it sharpens the mind. I would like to introduce a performance appraisal system for them as well.*

Intelligent software, tutored by its designers but also, crucially, learning from its users, can spot underlying themes and concepts as well as key words. It says I need help with

- *Team management (90%)*
- *Motivation (70%)*
- *Performance appraisal systems (100%)*
- *Time management (self) (50%)*
- *Objective setting (25%)*

I am surprised that it is thought I need help in some of these areas but I am not threatened because it is only a machine. But if unhappy with the list I can reject it or say some more.

So I say some more.

> *I am concerned that the team will not be as effective if I am not there to give them a strong lead. Can they be relied upon to take responsibility and how will I be certain they have done what they say they have done?*

And the software responds, this time confirming some previous items but increasing the importance of Team Management and introducing something new, leadership.

This iterative process is itself very valuable. It opens my eyes to possible priority actions for the future. I can go on talking to the machine, it is infinitely patient and remembers what I said. I can quit at any time, or reject the list. I remain in control.

I choose Team Management.

I am now in the centre of things. Everything revolves round my development programme.

Behind the scenes the intelligent software has been raiding the extensive database and marshalling relevant services and support for my own personal needs.

I can call on any of them, instantly, when I need to. I draw your attention to some of them:

- ***Quick tips***
- *An **action plan** tool built round my 5 questions;*
- *A database of relevant **benchmarks***
- *Examples of **good practice**, which I interrogate - Best practice from elsewhere informs development, it does not determine development.*
- ***Networks** of others with similar interests.*
- ***Help** from online mentors,*
- ***Resources** - texts, tools,*
- ***Courses and awards** opportunity for submitting the action plan and its achievement for **academic credit** from universities or other awarding bodies.*
- ***Success stories**, not necessarily of best practice, but of people like me who have improved their own practice, and how they achieved it. I might end up being celebrated too!*

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These three cases all

- put and keep the user in control,
- tap into their personal motivation,
- relate directly to improvements in practice,
- provide instant access to expert help, support and resources, and
- provide opportunity for recognition and academic credit for their effort and achievement.

All three examples make effective use of ICT to support an approach to work-based learning that is relevant to both the user and the employer. They represent prime examples of synergy between learning through work, new technology and learner-managed pedagogy.

CONCLUSION

This paper has looked at the problem of how best to provide an online e-learning support service to help people learn through their work. Five recent and ongoing projects completed by ICLML explored in the context of wider experience suggest that online work-based learning will succeed where it is

- personalised,
- managed by the user,
- relevant to the user's everyday work and aspirations,
- supported by the employer,
- linked to just-in-time specialist material and
- fully supported within a healthy learning milieu.

The evidence suggests that current practice is only making limited usage of the full range of technical facilities currently available and scarcely refers to underlying pedagogical principles of learning at work. Three examples illuminate the way forward. Each focuses on the personal motivation of the learner, involves the learner in improving their own practice, uses the technology to feed specialist needs as and when they need them and places the user firmly in control.

Online work-based learning is more likely to meet the promise expected of it by governments, companies and suppliers when designers and providers of services and materials bring together the principles of self-managed learning, constructivist pedagogy, an understanding of the dynamics of learning at work, sensitivity to user motivation, opportunities for personal recognition and an awareness of what is technically possible.

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APPENDIX A

A selection of reports included in the Coomey and Stephenson (2001) review of e-learning.

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APPENDIX B

Features of online learning conducive to more learner managed modes of learning, based on 'reports from the field' in 2000 (Stephenson, 2001):

- Easy **access** to and interrogation of high volumes of **diverse learning resources**, including texts, pictures, library materials, learning tools and other aids to learning assembled by the teacher and institution;
- Ease of **access** to other **materials from other sources**, including non-educational sources;
- Ease of **access to experts**, inside and external to the institution;
- **Dialogue**: - teacher - student, student - student, specialist closed groups, open groups, in real-time (synchronous) or over a period (asynchronous), one-to-one, one-to-many, many-to-many;
- **Routine recording** of all transactions in an accessible form capable of adaptation and access as lessons from other students' experience and concerns, threads of discussions and development of argument, frequently asked questions, and for quality assurance and accessible archives;
- **Access** to a range of **personal support** by e-mail with tutor and mentors, or through specialist or peer discussion groups;
- **Ease of navigation** to sources and persons - within and outside the package of materials - according to the interests and needs of the learner;
- **Logging** or tracking of activities for personal records or sharing;
- **Multi levels of engagement** via navigation buttons - to different depths of understanding, different volumes of data, difficulty of learning activities - according to the interest or capacity of the learner;
- **Feedback** loops, either from teachers, peers and others or from within the materials themselves through **progress checking**, quizzes and online assessment;
- Linkages to **other media**, such as sound, video and TV;
- Ease of access to **simulations** of dangerous or complex activities for learning purposes;
- Choice of **learning styles** within the same package according to needs of the learner;

Opportunities for working 'live' in **collaboration** with others from anywhere in the world.

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ERIC Clearinghouse on Assessment and Evaluation
University of Maryland, College Park
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College Park, MD 20742